

**Massachusetts Department of Environmental Protection**  
Bureau of Waste Prevention - Permitting - Air Quality Section

# BWP AQ 22

## Municipal Waste Combustor - Emission Control Plan (ECP)

Transmittal Number \_\_\_\_\_

Facility ID# (if known) \_\_\_\_\_

### A. Facility Information

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. Facility:

Facility Name \_\_\_\_\_

Street Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip Code \_\_\_\_\_

Mailing address (if different from above):

Street Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip Code \_\_\_\_\_

2. Facility Contact Person:

Name \_\_\_\_\_

Title \_\_\_\_\_

Telephone Number (include area code and extension) \_\_\_\_\_

3. Facility Owner:

Owner or Corporation Name \_\_\_\_\_

Telephone Number (include area code and extension) \_\_\_\_\_

### B. Facility Description and Plant Schematic (Attach Separate Sheet)

### C. Incinerator Unit (Complete Section C for each unit)

1. Unit Number \_\_\_\_\_

2. Manufacturer \_\_\_\_\_

3. Model Number \_\_\_\_\_

4. Maximum Continuous Rated Design Capacity:

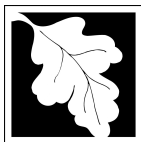
a. Heat Input

MMBtu/hr \_\_\_\_\_

b. Steam Load

lbs/hr \_\_\_\_\_

5. Waste Type \_\_\_\_\_



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### **C. Incinerator Unit (cont.)**

6. Heat Recovery? ☐ Yes ☐ No

a. Steam Flow Meter (or Feedwater Meter) \_\_\_\_\_

b. Manufacturer(s) or Equivalent \_\_\_\_\_

c. Model Number \_\_\_\_\_

d. Maximum Rating \_\_\_\_\_

lb/hr

7. Auxiliary Burners:

a. Manufacturer(s) or Equivalent \_\_\_\_\_

b. Model Number \_\_\_\_\_

c. Type of Fuel Used \_\_\_\_\_

d. Maximum rating \_\_\_\_\_

Btu/hr

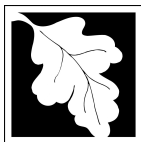
8. Date of Installation \_\_\_\_\_

### **D. Existing Permits**

1. In the Table below list all existing Plan Approvals the facility is currently subject to, including specific emission limits. One objective of the ECP is to minimize redundant recordkeeping by the facility while at the same time improving the reporting requirements by having all pertinent information reported in a uniform and standardized format.

Since 310 CMR 7.08(2) establishes emissions limits in terms of concentrations, all existing Plan Approval emission limits shall be converted to concentrations. The methodology involved in converting existing emission limits (e.g. lbs/MMBtu) to concentrations (e.g. mg/dscm) must be included in this ECP along with detailed calculations, references and any assumptions made in the conversion. (Attach Separate Sheet)

<b>Approval Number</b>	<b>Regulated Pollutants</b>	<b>Current Emission Limits</b>	<b>Converted Emission Limits</b>	<b>Averaging Time</b>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____



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### E. Emissions Control for PM, OPACITY, HCl, SO<sub>2</sub>, Cd and Pb

(Complete Section E for each unit)

1. Existing Controls: (If none, check here ☐)

	PM, Opacity, Cd and Pb	HCl and SO <sub>2</sub>
Type	_____	_____
Manufacturer(s) or Equivalent	_____	_____
Model	_____	_____
Date of Installation	_____	_____
Expected Useful Life of the Equipment	_____	_____
Efficiency of Unit	_____	_____
Capacity of the Unit	_____	_____
	scfm	scfm

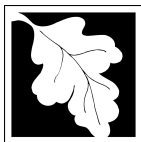
2. Proposed Controls: (If none, check here ☐)

	PM, Opacity, Cd and Pb	HCl and SO <sub>2</sub>
Type	_____	_____
1 - Fabric Filter use form BWP AQ SFC-1		
2 - ESP use form BWP AQ SFC-6		
3 - Spray Dryer use form BWP AQ SFC-3		
4 - Other (See attached instructions)		

Are Existing Emission Controls Being Removed? ☐ Yes ☐ No

3. Emissions Limitations:

Proposed Emission Limits: (mg/dscm, ppmv @ 7% O <sub>2</sub> )	Average Time if Applicable
PM	_____
Cd	_____
Pb	_____
SO <sub>2</sub>	_____
HCl	_____
Opacity	_____



## E. Emissions Control for PM, OPACITY, HCl, SO<sub>2</sub>, Cd and Pb (cont.)

4. Standard Operating and Maintenance Procedures: (Shall be submitted prior to operation):

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## F. Emissions Control for Mercury

**Proposed Controls If Not Activated Carbon Injection System:** (Attach Separate Sheet)

**Activated Carbon Injection System:**

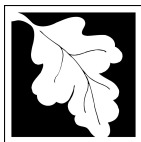
1. Process Description: \_\_\_\_\_

2. Process Parameters:	Unit 1	Unit 2	Unit 3
a. Flue Gas Flow Rate Per Unit:	_____	_____	_____
	dscm/min @ 7%O <sub>2</sub>	dscm/min @ 7%O <sub>2</sub>	dscm/min @ 7%O <sub>2</sub>
b. Estimated Maximum Uncontrolled Mercury Concentration:	_____	_____	_____
	mg/dscm @ 7%O <sub>2</sub>	mg/dscm @ 7%O <sub>2</sub>	mg/dscm @ 7%O <sub>2</sub>

3. Design Parameters:			
a. Design Control Emission Limitation:	_____	_____	_____
	mg/dscm @ 7%O <sub>2</sub>	mg/dscm @ 7%O <sub>2</sub>	mg/dscm @ 7%O <sub>2</sub>
b. Design Control Efficiency at Maximum Estimated Uncontrolled Mercury Concentration:	_____	_____	_____
	%	%	%

4. Carbon Handling:			
a. Raw Materials	% Residual Volatile Content	Internal Surface Area	Average Pore Radius
_____	_____	_____	_____
		m <sup>2</sup> /g	meters
_____	_____	_____	_____
		m <sup>2</sup> /g	meters
_____	_____	_____	_____
		m <sup>2</sup> /g	meters

5. Carbon Storage Facility:
- a. Type of Tank, Bin or Hopper: \_\_\_\_\_



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Dimensions: \_\_\_\_\_

Capacity: \_\_\_\_\_

### F. Emissions Control for Mercury (cont.)

- b. Is Dust Collector Required? ☐ Yes ☐ No

1. If yes, the dust collector shall meet the design criteria in 310 CMR 7.03(9)

#### 6. Activated Carbon Handling System:

- a. Manufacturer(s) or Equivalent of equipment: \_\_\_\_\_

1. Volumetric Feeder: \_\_\_\_\_

2. Injection System: \_\_\_\_\_

- b. Expected Useful Life of the Equipment: \_\_\_\_\_

\_\_\_\_\_ yrs

- c. Capacity of the System: \_\_\_\_\_

#### 7. Standard Operating and Maintenance Procedures (Shall be submitted prior to operation)

### G. Emission Control for Nitrogen Oxides

**Proposed Controls:** (If none, check here ☐ )

1. Process Description (Attach Separate Sheet)
2. Design Parameters (Attach Separate Sheet)
3. Materials Handling Description (Attach Separate Sheet)

#### 4. Process Parameters:

**Unit 1**

**Unit 2**

**Unit 3**

- a. Flue Gas Flow Rate:

\_\_\_\_\_ dscm/min @ 7%O<sub>2</sub>

\_\_\_\_\_ dscm/min @ 7%O<sub>2</sub>

\_\_\_\_\_ dscm/min @ 7%O<sub>2</sub>

- b. Estimated Maximum Uncontrolled NO<sub>x</sub> Concentration:

\_\_\_\_\_ ppmv @ 7%O<sub>2</sub>

\_\_\_\_\_ ppmv @ 7%O<sub>2</sub>

\_\_\_\_\_ ppmv @ 7%O<sub>2</sub>

- c. Estimated Average Uncontrolled NO<sub>x</sub> Concentration:

\_\_\_\_\_ ppmv @ 7%O<sub>2</sub>

\_\_\_\_\_ ppmv @ 7%O<sub>2</sub>

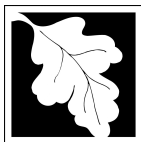
\_\_\_\_\_ ppmv @ 7%O<sub>2</sub>

- d. Design Control Emission Limitation:

\_\_\_\_\_ ppmv @ 7%O<sub>2</sub>

\_\_\_\_\_ ppmv @ 7%O<sub>2</sub>

\_\_\_\_\_ ppmv @ 7%O<sub>2</sub>



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e. Design Control Efficiency at Maximum Estimated \_\_\_\_\_ % \_\_\_\_\_ % \_\_\_\_\_ %  
Uncontrolled NOx Concentration: \_\_\_\_\_

### **G. Emission Control for Nitrogen Oxides (cont.)**

**5. Reagent Storage Facility:**

a. Type of Tank, Bin or Hopper: \_\_\_\_\_

Dimensions: \_\_\_\_\_ Capacity: \_\_\_\_\_

b. Is Dust and/or Vapor Collector Required? ☐ Yes ☐ No

1. If yes, submit detailed data for the dust and/or vapor collection equipment, such as, but not limited to, capture efficiency, temperature capability, maximum capacity, and method of cleaning

**6. Standard Operating and Maintenance Procedures (Shall be submitted prior to operation)**

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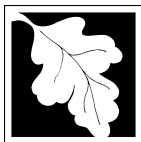
### **H. Fugitive Ash Handling Emission Controls**

1. Description of Existing Controls (Attach Separate Sheet)
2. Description of Proposed Controls (Attach Separate Sheet)
3. Standard Operating and Maintenance Procedures (Shall be submitted prior to operation)

### **I. Retrofit Schedule**

Municipal Waste Combustor Facilities Requiring Longer Than 18 Months to Comply with the Regulation Shall Provide the Following:

1. Dates of all existing contract awards involving air pollution control systems or for process modifications. Dates for issuance of any additional orders for the purchase of air pollution control equipment. All contracts necessary to bring the municipal waste combustor unit(s) into compliance shall be executed no later than eighteen months from the effective date of the regulation.
2. Date initiating on-site construction or installation of air pollution control equipment or process modification, as necessary. This date shall not exceed twenty four months from the effective date of the regulation.
3. Date the completion of on-site construction or installation of air pollution control equipment, or process modification will be achieved. This date shall not exceed thirty months from the effective date of this regulation, but no later than November 19, 2000.



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Facility ID# (if known) \_\_\_\_\_

### **J. Professional Engineer Certification**

The seal and signature of a Massachusetts Registered Professional Engineer must be entered below. This certifies that the information contained in this application has been checked for accuracy, and that the design represents good air pollution control engineering practice.

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
Position/Title

\_\_\_\_\_  
Representing

\_\_\_\_\_  
Date

\_\_\_\_\_  
P.E. #

### **K. Affirmative Demonstration of Compliance**

The signature below provides the affirmative demonstration pursuant to 310 CMR 7.08(2) j.3. that any facility(ies) in Massachusetts, owned or operated by the proponent for this project (or by an entity controlling, controlled by or under common control with such proponent) that is subject to 310 CMR 7.00, et seq. and 310 CMR 19.00, et seq., is in compliance with, or on a Department approved compliance schedule to meet, all provisions of 310 CMR 7.00, et seq. and 310 CMR 19.00 et seq., and any plan approval, order, notice of noncompliance or permit issued thereunder. This form must be signed by a reasonable official working at the location of the proposed new or modified facility. Even if an agent has been designated to fill out this form, the responsible official must sign it. (Refer to the definition given in 310 CMR 7.00.)

I certify that I have examined the responses provided herein and that to the best of my knowledge they are true and complete.

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Signature of Responsible Official

\_\_\_\_\_  
Position/Title

\_\_\_\_\_  
Representing

\_\_\_\_\_  
Date



Facility ID# (if known)

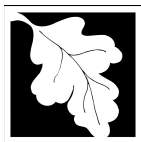
**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



City/Town \_\_\_\_\_ Zip Code \_\_\_\_\_

1. Manufacturer \_\_\_\_\_
2. Model# (attach manufacturer's brochures and specifications) \_\_\_\_\_
3. What is the capacity of the unit?  
ACFM \_\_\_\_\_ in. W.G. pressure drop \_\_\_\_\_
4. How many compartments are in the unit? \_\_\_\_\_
5. How many filter elements are in each compartment? \_\_\_\_\_
6. What type of filter material is used? \_\_\_\_\_
7. Is the filter material: ☐ woven? ☐ non-woven?
8. What is the maximum recommended temperature? (°F). \_\_\_\_\_
9. Describe filter elements (tubes, envelopes, cartridges, other) \_\_\_\_\_
10. What is the real effective area per filter element (ft.<sup>2</sup>) \_\_\_\_\_





**Massachusetts Department of Environmental Protection**  
Bureau of Waste Prevention – Air Quality

**BWP AQ SFC-1** (for use with BWP AQ CPA-3)

Supplemental Form for Dry Air Filters

Transmittal Number \_\_\_\_\_

Facility ID# (if known) \_\_\_\_\_

**D. Operating Conditions for this Permit**

1. What is the average inlet gas flow? \_\_\_\_\_  
(ACFM, wet)
2. What is the moisture content in the inlet? \_\_\_\_\_  
(lbs/min) (grains/ACF)
3. What is the face velocity? \_\_\_\_\_  
(ft/sec)
4. What are the gas temperatures (°F, dry bulb) for the \_\_\_\_\_  
inlet? outlet?
5. What is the pressure drop across the unit? (in. W.G.) \_\_\_\_\_  
minimum maximum

NOTE: Supporting calculations and explanatory notes must be attached.

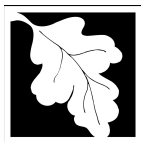
**E. Particulate Collection Data**

1. Describe the particle size weight to be emitted by the proposed unit:

	% of total weight	% of fraction collected
a. < 1 micron:	_____	_____
b. 1 micron < 10 microns:	_____	_____
c. 10 microns < 50 microns:	_____	_____
d. > 50 microns:	_____	_____
2. What is the overall particulate collection efficiency? \_\_\_\_\_
3. What is the inlet particulate concentration? (gr/ACF) \_\_\_\_\_
4. What is the outlet particulate concentration? (gr/ACF) \_\_\_\_\_
5. What is the emission rate? (lbs/hr) \_\_\_\_\_

**F. Cleaning Procedures and Particulate Disposal**

1. Describe the cleaning mechanism (pulse jet, reverse jet, sonic, rapping, or other) \_\_\_\_\_
2. What is the estimated time between cleaning phases? \_\_\_\_\_  
Seconds
3. How many filter elements are cleaned at the same time? \_\_\_\_\_



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**BWP AQ SFC-1** (for use with BWP AQ CPA-3)

Supplemental Form for Dry Air Filters

Transmittal Number \_\_\_\_\_

Facility ID# (if known) \_\_\_\_\_

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**F. Cleaning Procedures and Particulate Disposal (cont.)**

4. Describe the controller (timer, pressure gauge, or other): \_\_\_\_\_
5. What are the number of filter elements in operation during the cleaning phase? \_\_\_\_\_
6. Describe the collection hoppers and unloading schedule  
\_\_\_\_\_  
\_\_\_\_\_
7. How is the unloading schedule documented?  
\_\_\_\_\_
8. What is the ultimate disposal method?  
\_\_\_\_\_
9. Is the dust subject to 310 CMR 30.00, pertaining to Hazardous Waste?  
☐ Yes    ☐ No

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**G. Air Flow Data**

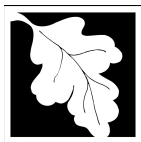
1. What is the air flow into the filter system? (ACFM) \_\_\_\_\_  
minimum maximum
2. Describe what measures are taken to evenly distribute inlet air to all filter elements:  
\_\_\_\_\_  
\_\_\_\_\_
3. What is the air to cloth ratio? (ACFM divided by the effective filter area): \_\_\_\_\_

NOTE: Detailed fan specifications must be supplied with this application. See form BWP AQ CPA-3 for instructions.

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**H. Drawing of Dry Air Filter Unit**

A schematic drawing of the dry air filter unit must be **attached** to this form. The drawing must show all access doors, catwalks, ladders, and exhaust ductwork. In addition, the location of each pressure and temperature indicator must be shown.



**Massachusetts Department of Environmental Protection**

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**BWP AQ SFC-1** (for use with BWP AQ CPA-3)

Supplemental Form for Dry Air Filters

Transmittal Number

Facility ID# (if known)

**I. Failure Notification**

1. How is the failure of the dry air filter made known to the operator during normal operations (e.g. audible alarm, flashing lights, temperature indicator, pressure indicator, etc.)?

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2. Describe the record keeping procedures to be used in identifying the cause, duration and resolution of each failure (use a separate page if necessary)

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NOTE: The regional office must be notified immediately by telephone in the event of a dry air filter failure.

**J. Certification**

The seal and signature of a Massachusetts Registered Professional Engineer must be entered to the right. This certifies that the information contained in this form has been checked for accuracy, and that the design represents good air pollution control engineering practice. (These must be originals; no photocopies, etc. of the seal and signature will be accepted.)

Print Name

Authorized Signature

Position/Title

Representing

Date

P.E. #



Massachusetts Department of Environmental Protection  
Bureau of Waste Prevention – Air Quality

**BWP AQ SFC-3** (for use with BWP AQ CPA-3)

Supplemental Form for Wet Collection Equipment

Transmittal Number \_\_\_\_\_

Facility ID# (if known) \_\_\_\_\_

**A. Plan Application Requirements**

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



This form is to be submitted together with forms BWP AQ CPA1, CPA3 or CPA4, prior to the construction, substantial reconstruction or alteration of **Wet Collection Equipment**.

**B. Project Location**

1. Name of facility: \_\_\_\_\_

2. Location of project site: \_\_\_\_\_

Street \_\_\_\_\_

City/Town \_\_\_\_\_

Zip Code \_\_\_\_\_

**C. Wet Collection Equipment Specifications**

1. Manufacturer \_\_\_\_\_

2. Model # \_\_\_\_\_

3. What is the capacity of the unit? \_\_\_\_\_

SCFM

@ standard temperature of °F \_\_\_\_\_

4. What type of unit is being installed? (e.g. gravity spray tower, plate scrubber, venturi scrubber, packed bed scrubber, centrifugal spray scrubber, other):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. What material is the outer shell made of? (mild steel, stainless steel, non-ferrous metal, plastic, other)  
\_\_\_\_\_  
\_\_\_\_\_

6. What material is the inner shell made of?  
\_\_\_\_\_  
\_\_\_\_\_

**DEP Use Only**

Permit No. \_\_\_\_\_

Received Date \_\_\_\_\_

Reviewer \_\_\_\_\_

Permit

☐ Approved

☐ Denied

Decision Date \_\_\_\_\_



**Massachusetts Department of Environmental Protection**  
Bureau of Waste Prevention – Air Quality

**BWP AQ SFC-3** (for use with BWP AQ CPA-3)

Supplemental Form for Wet Collection Equipment

Transmittal Number \_\_\_\_\_

Facility ID# (if known) \_\_\_\_\_

**C. Wet Collection Equipment Specifications (cont.)**

7. What is the expected useful life of the equipment? \_\_\_\_\_

yrs

8. What steps have been taken to protect against corrosion?

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NOTE: Dimension plan(s) of the collection equipment must be attached to this form. The plan(s) must show, at a minimum, the gas inlet duct, gas outlet duct, liquid inlet piping, liquid outlet piping, back flow preventor location, access doors, temperature sensors, pH indicators, flow sensors, liquid level sensors, stack location, nozzle locations, by-pas stack location and other scrubber internals.

9. What is the cross-sectional area? \_\_\_\_\_

square feet

10. How many collection stages are there? \_\_\_\_\_

11. What is the length of the unit? \_\_\_\_\_

feet

12. What is the cross-sectional shape? \_\_\_\_\_

square, round, etc.

13. Describe the internal features (e.g. demisters, gas/liquid diffusion plates, liquid redistributors, bed limiters, etc.):

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**D. Operating Parameters**

1. What is the inlet gas flow rate? \_\_\_\_\_

ACFM, wet

2. What is the inlet moisture rate? \_\_\_\_\_

lbs/min

3. What is the temperature of the:

inlet? \_\_\_\_\_

°F

outlet? \_\_\_\_\_

°F

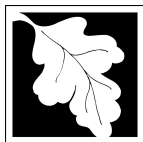
4. What is the static pressure in the:

inlet? \_\_\_\_\_

in. of water

outlet? \_\_\_\_\_

in. of water



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**BWP AQ SFC-3** (for use with BWP AQ CPA-3)

Supplemental Form for Wet Collection Equipment

Transmittal Number \_\_\_\_\_

Facility ID# (if known) \_\_\_\_\_

**D. Operating Parameters (cont.)**

5. What is the outlet gas flow rate?

ACFM, wet \_\_\_\_\_

6. What is the normal oxidation/reduction potential set point range? \_\_\_\_\_

7. What is the normal pH set point range? \_\_\_\_\_

**E. Emission Data**

1. Give the maximum gaseous emission rates at stack exit:

	Chemical Name	Before Control (lbs/hr)	After Controls (lbs/hr)	After Controls (ug/DSCM*)
a.	_____	_____	_____	_____
b.	_____	_____	_____	_____
c.	_____	_____	_____	_____

\* DSCM = Dry Standard Cubic Meter

2. What is the overall gaseous collection efficiency? \_\_\_\_\_

%

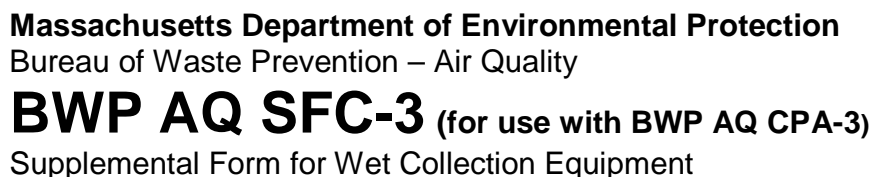
3. Give the maximum particulate emission rates at stack exit:

	Chemical Name	Before Control (lbs/hr)	After Controls (lbs/hr)	After Controls (ug/DSCM*)
a.	_____	_____	_____	_____
b.	_____	_____	_____	_____
c.	_____	_____	_____	_____

\* DSCM = Dry Standard Cubic Meter

4. Describe the particulate size for the proposed unit: (include citations of test data or a list of references used):

	% of total	% of fraction collected
a. < 1 micron:	_____	_____
b. 1 micron < 10 microns:	_____	_____
c. 10 microns < 50 microns:	_____	_____
d. > 50 microns:	_____	_____

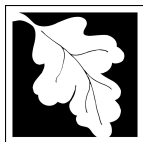


Facility ID# (if known)

5. What is the overall particulate collection efficiency?	_____	
	mass %	
6. What is the inlet particulate concentration?	_____	
	grains/ACF	
7. What is the outlet particulate concentration?	_____	
	grains/ACF	
8. What is the capture efficiency of the ventilation system serving the collection equipment?	_____	_____
	gaseous %	particulate %

## F. Description of Scrubbing Liquid

- aq22app • 10/01



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Supplemental Form for Wet Collection Equipment

Transmittal Number \_\_\_\_\_

Facility ID# (if known) \_\_\_\_\_

**F. Description of Scrubbing Liquid (cont.)**

10. Give a description of the chemical additive(s) used:

	Chemical Name	Max. Feed Rate (lbs/hr)	% Strength (as mixed w/ water)	Reaction Products
a.	_____	_____	_____	_____
b.	_____	_____	_____	_____
c.	_____	_____	_____	_____

11. Give a detailed description of the contaminants transferred to the scrubbing liquid:

a. Liquid/solid contaminants: \_\_\_\_\_  
lbs/hr  
briefly describe: \_\_\_\_\_

b. Gases absorbed: \_\_\_\_\_  
lbs/hr  
briefly describe: \_\_\_\_\_

c. Are these contaminants subject to 310 CMR 30.00 pertaining to the control of Hazardous Waste?

☐ Yes ☐ No

If yes, identify the company which will dispose of the contaminated scrubbing liquid:

\_\_\_\_\_

d. Is a discharge permit (BWPIWW02) needed?

☐ Yes ☐ No

If Yes, attach copy of the permit

**The following six sections ask questions about specific types of wet collection equipment.  
The applicant should respond only to those questions pertaining to the proposed unit.**

**G. Gravity Spray Tower Scrubber**

1. What type of spray nozzles will be installed? (pressure, rotating, gas atomizing, sonic, other, explain):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_





**Massachusetts Department of Environmental Protection**  
Bureau of Waste Prevention – Air Quality

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Supplemental Form for Wet Collection Equipment

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Facility ID# (if known) \_\_\_\_\_

**G. Gravity Spray Tower Scrubber (cont.)**

2. How many nozzles will be installed? \_\_\_\_\_
3. Give the location of each nozzle: \_\_\_\_\_
4. What is the pressure drop across the nozzles? \_\_\_\_\_  
psig
5. What is the normal liquid to gas ratio? \_\_\_\_\_  
by weight  
specify units \_\_\_\_\_  
square feet
6. Give the cross sectional area of the tower: \_\_\_\_\_
7. What is the height of the tower? \_\_\_\_\_  
feet
8. What is the superficial gas velocity? \_\_\_\_\_  
feet/second
9. Is the gas flow: ☐ concurrent? ☐ countercurrent?
10. What is the gas retention time? \_\_\_\_\_  
seconds
11. Is a mist eliminator used? ☐ Yes ☐ No
12. Are baffles present? ☐ Yes ☐ No
13. Does the unit have liquid redistributors? ☐ Yes ☐ No
14. Describe other features: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**H. Centrifugal Spray Scrubber**

1. What is the normal liquid to gas ratio? \_\_\_\_\_  
by weight  
specify units \_\_\_\_\_
2. What is the height of the unit? \_\_\_\_\_  
feet
3. What is the diameter of the unit? \_\_\_\_\_  
feet
4. What is the retention time of the gas? \_\_\_\_\_  
seconds
5. Is the spray directed outward? ☐ Yes ☐ No



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**H. Centrifugal Spray Scrubber (cont.)**

6. What type of spray nozzles will be installed? (pressure, rotating, gas atomizing, sonic, other, explain)

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**I. Plate Scrubber**

1. What is the normal liquid to gas ratio?

\_\_\_\_\_

by weight

\_\_\_\_\_

specify units

2. What is the cross sectional area?

\_\_\_\_\_

square feet

3. What is the height of the unit?

\_\_\_\_\_

feet

4. How many trays are there?

\_\_\_\_\_

5. What is the spacing between the trays?

\_\_\_\_\_

6. List and describe briefly, the type of tray to be used (sieve, impingement, bubble cap, valve, other):

---

---

7. What is the depth of the liquid seal?

\_\_\_\_\_

inches

8. What is the size of the tray active area?

\_\_\_\_\_

square inches

9. What is the size of the tray downcomer area?

\_\_\_\_\_

square inches

10. What is the size of the tray perforation area?

\_\_\_\_\_

square inches

11. What is the number of liquid passes per tray?

\_\_\_\_\_

12. What is the type of flow?

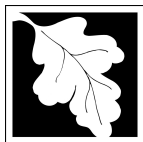
\_\_\_\_\_

cross, counter, cascade, split

13. List other internal features:

---

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**J. Venturi Scrubbers**

1. What is the normal liquid to gas ratio?

\_\_\_\_\_ by weight

\_\_\_\_\_ specify units

2. Is the throat adjustable? ☐ Yes ☐ No

3. If Yes, how is it controlled? (describe briefly):

4. How large is the throat area?

\_\_\_\_\_ square inches

5. What is the shape of the throat cross section?

6. What is the throat pressure drop?

\_\_\_\_\_ inches of water

7. What is the throat velocity?

\_\_\_\_\_ feet/second

**K. Packed Bed Scrubber**

1. What is the normal liquid to gas ratio?

\_\_\_\_\_ by weight

\_\_\_\_\_ specify units

2. What is the height of the bed?

\_\_\_\_\_ feet

3. What is the cross sectional area of each bed?

\_\_\_\_\_ square feet

4. Describe the type of packing element:

5. What is the size of the packing element?

\_\_\_\_\_ inches

6. Is the packing: ☐ random? ☐ stacked? ☐ other?

If other, explain: \_\_\_\_\_

7. How many stages are there?

8. What is the packing factor (as given by manufacturer)?

9. What is the height of the transfer unit?

\_\_\_\_\_ feet

10. How many transfer units per bed are there?

11. What is the liquid flooding point?

\_\_\_\_\_ cubic feet/second

12. What is the gas loading point?

\_\_\_\_\_ cubic feet/second



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**K. Packed Bed Scrubber (cont.)**

13. The operating point is what % of the flooding point? \_\_\_\_\_

%

14. What is the pressure drop per foot of packing? \_\_\_\_\_

inches of water

15. Describe the packed bed (crossflow, counterflow, parallel flow, fluid bed, flooded bed, other):  
\_\_\_\_\_  
\_\_\_\_\_

16. What is the number of liquid redistributors? \_\_\_\_\_

17. What is the distance between the liquid redistributors? \_\_\_\_\_

inches

**(Attach separate sheet if necessary)**

**L. Failure Notification**

1. How is the failure of the collection device made known to the operator? (e.g. audible alarm, lights, etc.):  
\_\_\_\_\_  
\_\_\_\_\_

2. Describe the record keeping procedures that will be used in identifying the cause, duration, and resolution of each failure (use a separate page if necessary):  
\_\_\_\_\_  
\_\_\_\_\_

**M. Certification**

The seal and signature of a Massachusetts Registered Professional Engineer must be entered to the right. This certifies that the information contained in this form has been checked for accuracy, and that the design represents good air pollution control engineering practice. (These must be originals; no photocopies, etc. of the seal and signature will be accepted.)

Print Name \_\_\_\_\_

Authorized Signature \_\_\_\_\_

Position/Title \_\_\_\_\_

Representing \_\_\_\_\_

Date \_\_\_\_\_

Date \_\_\_\_\_



Massachusetts Department of Environmental Protection  
Bureau of Waste Prevention - Air Control

**BWP SFC-6** (for use with BWP AQ 02, 03)

**Supplemental Form for Electrostatic Precipitator**

Transmittal Number \_\_\_\_\_

Facility \_\_\_\_\_

**A. Plans Application Requirements**

This form is to be submitted together with form BWP AQ CPA-1, CPA-3, or CPA-4, whenever the modification or the installation of an **Electrostatic Precipitator** is desired.

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



**B. Project Location**

Name of facility \_\_\_\_\_

Location of project site \_\_\_\_\_

Street Address \_\_\_\_\_

City/town \_\_\_\_\_

State \_\_\_\_\_

Zip code \_\_\_\_\_

**C. Equipment Specifications**

1. Manufacturer \_\_\_\_\_
2. Model number \_\_\_\_\_
3. What is the capacity of the unit? \_\_\_\_\_  
SCFM
4. Describe the stages:
  - a. Single stage \_\_\_\_\_
  - b. Two-stage \_\_\_\_\_
5. Does the units use: ☐ Plates ☐ Tubes
6. How many power units are there? \_\_\_\_\_

**D. Conditions in the Gas Stream**

1. What the inlet gas flow? \_\_\_\_\_  
acfm, wet
2. What the moisture content in the inlet? \_\_\_\_\_  
lbs./min.
3. What is the inlet velocity? \_\_\_\_\_  
feet./second
4. Describe the gas temperature:  
inlet gas temperature (°F) \_\_\_\_\_  
outlet gas temperature (°F) \_\_\_\_\_
5. Is the inlet steam pre-cooled? ☐ Yes ☐ No



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**BWP SFC-6** (for use with BWP AQ 02, 03)

**Supplemental Form for Electrostatic Precipitator**

Transmittal Number \_\_\_\_\_

Facility \_\_\_\_\_

**E. Description of Particulate Pollutant**

1. Give a brief description of the particulate/aerosol in gas stream (chemical analysis):

\_\_\_\_\_  
\_\_\_\_\_

NOTE: The answers to the following questions require supporting calculations and explanatory notes before they can be accepted as part of the plan review.

2. Describe the particle size to be emitted by the proposed unit (in microns):

	% of total weight	% of fraction collected
a. < 1 micron:	_____	_____
b. $\geq 1 < 10$ microns:	_____	_____
c. $\geq 10 < 50$ microns:	_____	_____
d. > 50 microns:	_____	_____

3. Overall particulate collection efficiency: \_\_\_\_\_
4. Inlet particulate concentration: \_\_\_\_\_  
grns./acf
5. Outlet particulate concentration: \_\_\_\_\_  
grns./acf
6. Emission rate: \_\_\_\_\_  
lbs./hour
7. Particulate resistivity \_\_\_\_\_  
ohm-cm
8. Temperature at resistivity \_\_\_\_\_  
°F
9. Measure of % water at resistivity \_\_\_\_\_

10. Is the inlet stream conditioned? ☐ Yes ☐ No

If yes, explain: \_\_\_\_\_

11. Is the inlet stream pre-cleaned? ☐ Yes ☐ No

If yes, explain: \_\_\_\_\_



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**Supplemental Form for Electrostatic Precipitator**

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Facility \_\_\_\_\_

**F. Warning System**

1. Describe the warning/alarm system that protects against operation when unit is not meeting design efficiency:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**G. Power Requirements**

1. Describe the power requirements, if the unit is single stage:

- a. How is the power applied?

\_\_\_\_\_ watts/1000acfm

- b. What is the voltage applied?

\_\_\_\_\_ kilovolts

2. Describe the power requirements, if the unit is two stage:

- a. How much power is applied

\_\_\_\_\_ watts/1000acfm

- b. What is the ionizer voltage applied

\_\_\_\_\_ kilovolts

- c. What is the number of ionizer banks?

\_\_\_\_\_

- d. What is the collector voltage

\_\_\_\_\_ kilovolts

3. Describe the transformer rectifier sets:

- a. How many transformer rectifier sets are there?

\_\_\_\_\_

- b. What is the size of the transformer rectifier sets?

\_\_\_\_\_

4. Describe the discharge electrode:

- a. What length of wire is used?

\_\_\_\_\_

- b. What type of wire is used?

☐ Weighted

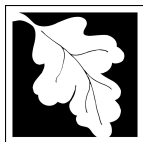
☐ Rigid

☐ Electrode

- c. Is the wire shrouded?

☐ Yes

☐ No



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Facility \_\_\_\_\_

**H. Plate or Tube Data**

1. Describe the plate dimensions (if applicable):

a. What is the height of the plate? \_\_\_\_\_

b. What is the length of the plate? \_\_\_\_\_

c. What is the thickness of the plate? \_\_\_\_\_

d. How many plates are there? \_\_\_\_\_

e. What is the spacing between the plates? \_\_\_\_\_

2. Describe the tube dimensions:

a. What is the height of the tube? \_\_\_\_\_

b. What is the inside diameter of the tube? \_\_\_\_\_

c. What is the outside diameter of the tube? \_\_\_\_\_

d. How many tubes are there? \_\_\_\_\_

e. What is the spacing between the tubes? \_\_\_\_\_

**I. Particulate Removal Form Collection Electrodes**

1. Thickness of the particulates at cleaning: \_\_\_\_\_

2. Method is used in cleaning the electrodes: \_\_\_\_\_

3. How often are the electrodes cleaned? \_\_\_\_\_

4. How many collection hoppers are there? \_\_\_\_\_

5. What is the capacity of each hopper? \_\_\_\_\_

6. How often are the hoppers cleaned? \_\_\_\_\_

7. What type of rapper is used? \_\_\_\_\_

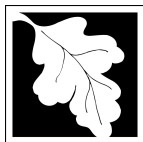
8. What type of rapper control is used? \_\_\_\_\_

magnetic, pneumatic, etc.

9. What is the total time per cleaning sequence? \_\_\_\_\_

10. What is the ultimate disposal method? \_\_\_\_\_





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Facility \_\_\_\_\_

**J. Miscellaneous Data**

1. Pressure drop across the unit: \_\_\_\_\_  
in. water
2. Residence time of gases in the collection zone: \_\_\_\_\_  
seconds
3. How many fields are there? \_\_\_\_\_
4. What is the size of the fields? \_\_\_\_\_
5. What is the field efficiency? \_\_\_\_\_  
% each field
6. What is the aspect ratio? \_\_\_\_\_
7. What is the superficial velocity? \_\_\_\_\_
8. What type of insulators are used? \_\_\_\_\_
9. Describe the specific collecting area (SCA) (sq. ft/1000 ACFM):  
\_\_\_\_\_  
\_\_\_\_\_
10. Describe the specific corona power (SCP) (watts/1000 ACFM):  
\_\_\_\_\_  
\_\_\_\_\_

**K. Certification**

The seal and signature of a Massachusetts Registered Professional Engineer must be entered below. This certifies that the information contained in this form has been checked for accuracy, and that the design represents good air pollution control engineering practice. (These must be originals; no photocopies, etc. of the seal and signature will be accepted.)

Print name \_\_\_\_\_

Authorized signature \_\_\_\_\_

Position/title \_\_\_\_\_

Representing \_\_\_\_\_

Date \_\_\_\_\_

PE number \_\_\_\_\_